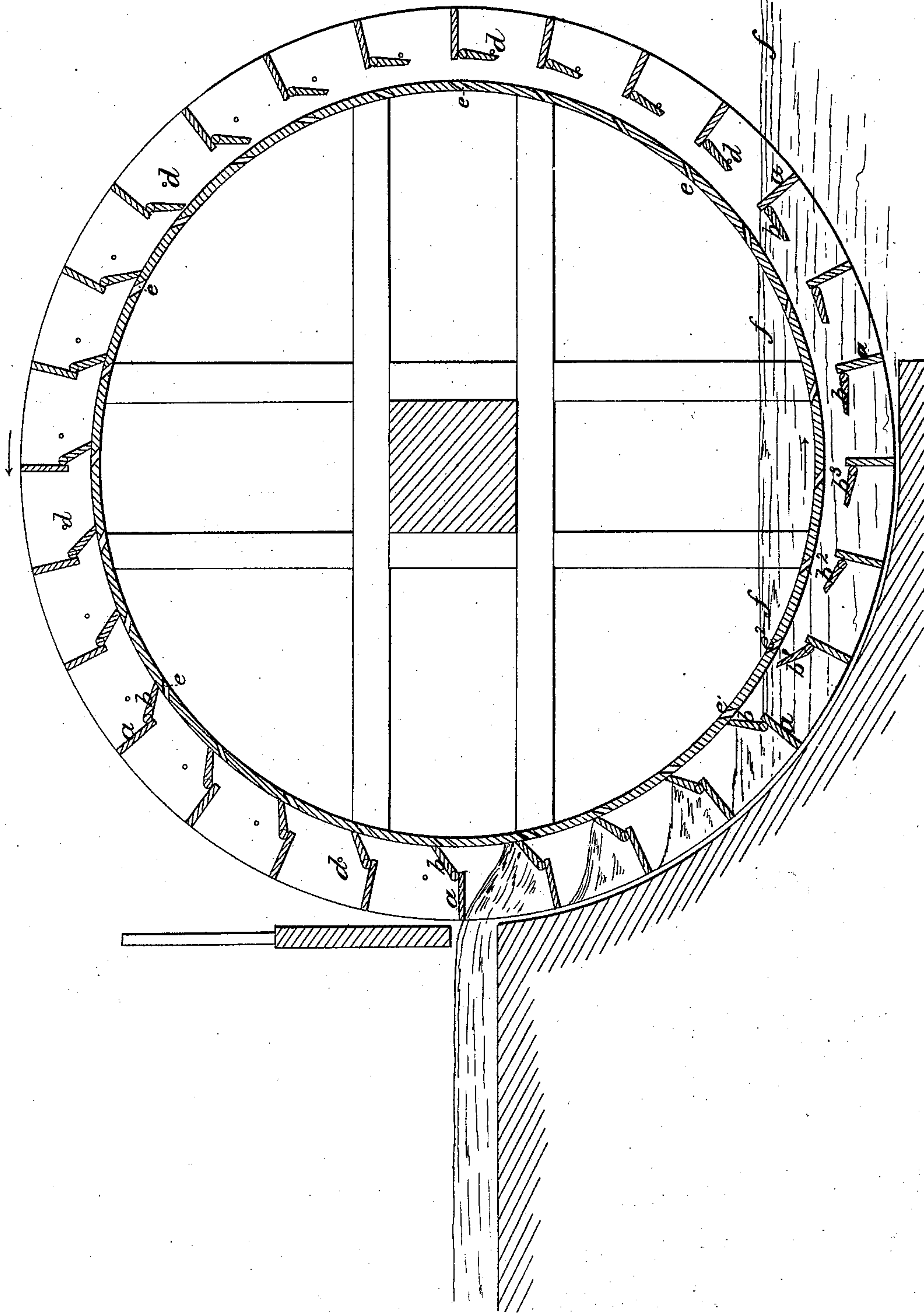


*E. Robbins Jr. & W. Ashby,*

*Water Wheel.*

*N<sup>o</sup> 1525.*

*Patented Mar. 25 1840.*





# UNITED STATES PATENT OFFICE.

EDWARD ROBBINS, JR., AND WM. ASHBY, OF BORDENTOWN, NEW JERSEY.

## CONSTRUCTION OF WATER-WHEELS.

Specification of Letters Patent No. 1,525, dated March 25, 1840.

*To all whom it may concern:*

Be it known that we, EDWARD ROBBINS, JR., and WILLIAM ASHBY, of Bordentown, in the county of Burlington and State of New Jersey, have invented an Improvement in the Manner of Constructing the Buckets of Breast and Pitch-Back Water-Wheels, by means of which improvement the air which necessarily remains in such buckets after they have received their water from the flume is allowed to escape through openings left in the sole or lining of the wheel for that purpose as the buckets in their descent are being immersed in the back or tail-race water; and we do hereby declare that the following is a full and exact description thereof.

In the accompanying drawing, the buckets *a, a, a*, are represented as having their planes in the radii of the axis of the wheel, and these we generally prefer, but they may be in other forms without changing the principle upon which our improvement is dependent. The portion *a, a, a* of each of the buckets is affixed firmly to the shrouding of the wheel in the usual manner, but the inner portion *b, b, b* of each of them is hinged to the part *a, a, a*, or is made to turn on pivots in the shrouding, so as to operate as valves, or shutters, extending the whole length of the buckets. The inner edges of these valves shut against the sole *c, c, c*, of the wheel, and should when closed, form an angle of about  $130^{\circ}$  with the plane of the buckets *a, a, a*, or with the radii of the wheel. Immediately below the closings of the valves *b, b*, against the sole or lining of the wheel, we make openings *e, e, e*, through said sole, or lining, extending along the whole width of the wheel or length of the buckets, which openings are for the escape of air when the buckets receive their water from the flume; but more particularly when they descend into the tail race, or back water.

*d, d, d*, are pins, or stops, of any suitable kind, to prevent the opening, or falling back, of the valves beyond a point at which they will form a right angle with the parts *a, a, a*, of the bucket. The line *f, f, f*, represents the supposed height of the water in the tail race. The arrows numbered 1, 2, 3, and 4, represent the open space between the valves, when open, and moving through back water; and the soling of the wheel, and they point in the direction which the water runs to fill the space of arrow No. 4, while the

air escapes, through the space *e*, arrow 5. The arrows numbered 6 and 7, represent the spaces; where the air escapes from the buckets when they are taking the water from the flume *g*.

The operation of the wheel under this arrangement will be apparent from an inspection of the drawings. The valve *b'* is shown as having just descended below the line *f, f*, of the back water, which comes in contact with the lower side of valve *b'* which it opens by pressure and allows the water to pass up between it and the soling, so as to fill the bucket completely, while the air escapes through the aperture *e*, in the direction of arrow No. 5, and in this way, the air escapes from each bucket, as they descend into the back water which instantly supplies its place; but for which openings, the air would be carried down, and be forced to descend with the buckets through the back water. This carrying down of the air, it must be manifest, would offer a considerable resistance to the motion of the wheel; and that it does so, is well known to us from the most satisfactory experiments which we have made. As the wheel turns around and the buckets rise above the line of its center horizontally the valves will approach, and eventually fall against the soling of the wheel, and be ready again to receive the water from the flume.

Great advantage is derived from this mode of constructing the buckets with the valves placed in the position described, and combined with the openings below them through the soling, not only from the lessening thereby of the effect of back water, but, also, from its admitting of a much wider air space in the soling of the wheel than when made in the ordinary way; the situation of the openings being such as not to produce any shedding of the water when the bucket is entirely full.

Having thus fully described the manner in which we construct our improved water wheel, and shown how the same operates, we do hereby declare that we do not claim as of our invention the application of valves to bucket, as we are aware that such application had been made prior to our use thereof, but in a way very different from that in which we have made it, and not effecting the same object, namely, the allowing of the free escape of air, and the free admission of water into the buckets, as they dip into the



tail race, or back water, and thus preventing the carrying down of the air through said water.

What we claim, therefore, as of our invention, and desire to secure by Letters Patent, is—

The employment of valves in buckets of water wheels, such valves having the position herein described, and represented in the accompanying drawing, and being used in combination with the openings through the soling of the wheel; that is to say said valves

forming an angle of  $130^{\circ}$  more or less with the radiating buckets, or with the radii of the wheel, and closing against its soling immediately above the openings for the escape of air, the whole being constructed and operating substantially in the manner set forth. 15

EDWARD ROBBINS, JR.  
WILLIAM ASHBY.

Witnesses:

JAMES PAINE,  
GEORGE JUSTICE.